

## REMARKS

Claim 1 has been amended so that it is directed to an isocyanate terminated prepolymer which is composed of a non-crystalline aliphatic or cycloaliphatic diisocyanate. Support for this amendment is found on page 3, lines 12-27 of the Application. Claim 1 has also been amended so that it is directed to a symmetric diol chain extender. Support for this amendment is found on page 4, lines 8-27 of the Application.

New Claim 12 has been added to the Application. This claim is directed to a light stable hydrophobic elastomer which is the reaction product of an isocyanate terminated prepolymer and 1,4-butanediol. Support for this claim is found on page 4, line 14 of the Application.

New Claims 13 and 14 have been added to the Application. These claims are directed to a process for preparing a light stable hydrophobic polyurethane elastomer. Support for these new claims is found on pages 5-8 of the Application. Applicants submit that no new matter has been added by these new claims.

The Patent Office rejected Claims 1-11 under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious in view of United States Patent No. 5,589,543 ("Yokelson et al.").

Additionally, the Patent Office rejected Claims 1-11 under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 6,166,166 ("Taylor et al."). The Patent Office also rejected Claims 1-8 and 10-11 under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 6,211,324 ("Haider et al."). Also, the Patent Office rejected Claims 1-2, 4-8 and 10-11 under 35 U.S.C. § 102(b) as being anticipated by United States Patent No. 4,741,961 ("Frisch et al."). Finally, the Patent Office rejected Claims 1-2, 4, 6 and 8-11 under 35 U.S.C. § 102(b) as being anticipated by the publication entitled "*Tensile Property of Modified Hydroxyl-Terminated Polybutadiene-Based Polyurethanes*" ("Huang et al."). These rejections are respectfully traversed.

### Summary of the Invention:

The present invention relates to a hydrophobic polyurethane elastomer comprising the reaction product of: a) an isocyanate terminated prepolymer having

an isocyanate content ranging from 4 to 12 wt.% NCO comprising the reaction product of i) an OH terminated homopolymer of butadiene and ii) a non-crystalline aliphatic or cycloaliphatic diisocyanate; and b) a symmetric diol chain extender. The elastomer of the present invention exhibits excellent mechanical properties.

Rejection of Claims 1-11 under 35 U.S.C. § 102(b) in view of Yokelson et al.:

Claims 1-11 stand rejected as being anticipated by Yokelson et al. The Patent Office believes that Yokelson et al. disclose the production of hydrophobic polyurethanes derived from the reaction of difunctional polybutadienes having molecular weights which overlap Applicants' diols, with diisocyanates such as isophorone diisocyanate and dicyclohexylmethane diisocyanate and diol chain extenders. The Patent Office also believes that Yokelson et al. disclose prepolymer techniques. The Patent Office thus concludes that Applicants' prepolymer isocyanate content is inherently met by Yokelson et al.

In order for a reference to anticipate, the claimed invention **must be the same** as that of the reference. See Glaverbel Societe Anonyme v. Northlake Marketing & Supply Inc., 45 F.3d 1550, 33 U.S.P.Q.2d 1496, 1498 (Fed. Cir. 1995). **Any degree of physical difference, however slight**, invalidates a claim of anticipation. See Ultrudent Products Inc. v. Life-Like Cosmetics Inc., 39 U.S.P.Q. 2d 1969, 1980 (Utah 1996). Applicants' claimed invention is not anticipated by Yokelson et al. because Yokelson et al. do not disclose a light stable hydrophobic polyurethane elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is prepared by reacting a hydroxyfunctional polybutadiene ("HFPB") and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**.

It is Applicants' position that Yokelson et al. illustrate, by way of their Example 2, a process for preparing an elastomer which involves reacting an **amine** chain extender and an isocyanate terminated prepolymer which is prepared by reacting a polyol with **toluene diisocyanate (TDI)**. See Yokelson et al., column 13, lines 15-19.

Thus, Applicants contend that while Yokelson et al. may generally disclose that the elastomers of their invention can be prepared by a prepolymer process,

Yokelson et al. do not provide any examples for preparing an elastomer having improved mechanical properties based on the reaction of a symmetric diol chain extender and an isocyanate terminated prepolymer comprising the reaction product of an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**.

While Applicants understand that the fact that a specification is devoid of a working example may not be of significance (See Ex parte Nardi and Simier, 229 U.S.P.Q. 79 B.P.A.I. 1986), Applicants also recognize the fact that, in order to have an enabling disclosure, the specification must contain a sufficiently explicit disclosure to enable one having ordinary skill in the relevant art to practice the claimed invention without the exercise of undue experimentation. See Ex parte Forman, 230 U.S.P.Q. 546 (B.P.A.I. 1986). Many factors are taken into account when determining what constitutes undue experimentation. See Tabuchi and Abe v. Nubel, Fitts and Lorenzo, 559 F.2d 1183, 194 U.S.P.Q. 521, 525 (C.C.P.A. 1977).

Yokelson et al. disclose that the isocyanates of their invention are isocyanates which **exhibit several or all of the following characteristics**: bulk; symmetry around the isocyanate functional groups; **rigidity; crystallinity; are aromatic** and highly pure. Aliphatic isocyanates are not aromatic. Additionally, one skilled in the art would recognize that **aliphatic isocyanates are less rigid than aromatic isocyanates**.

Considering the foregoing, Applicants respectfully contend Yokelson et al. do not provide a disclosure which would have enabled one skilled in this art to prepare an elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**. Applicants therefore submit that Claims 1-11 are not anticipated by Yokelson et al. Thus, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 1-11 under 35 U.S.C. § 102(b) in view of Yokelson et al. and enter allowance of these Claims.

Additionally, Applicants believe that new Claims 12, 13 and 14 are patentable in view of Yokelson et al.

Claim 12 is directed to a light stable hydrophobic polyurethane elastomer which is composed of the reaction product of 1,4-butanediol and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**. Yokelson et al. disclose that the compatibility of their claimed diol (DIFOL), **in contrast** to a diol used in the comparative example (poly(oxytetramethylene) glycol (PTMO) 2000), when combined with 1,4-butandiol, produces a hazy mixture. See Yokelson et al., column 10, lines 36-44. Applicants therefore contend that Yokelson et al. teach away from the use of 1,4-butanediol as a chain extender.

New Claim 13 is directed to a process for preparing a light stable hydrophobic polyurethane elastomer by forming a polyurethane reactive mixture which is prepared by reacting a symmetric diol chain extender and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate** and then allowing the mixture to cure in a mold.

In contrast, **before curing**, but after the mixture is poured into a mold, the reactive mixture disclosed in Example 2 of Yokelson et al. (which is based on an isocyanate-terminated prepolymer) is subjected to **compression** at 20,000 psi for one hour. See Yokelson et al., column 13, lines 28 and column 14, line 67.

New Claim 14 is directed to a process for preparing a light stable hydrophobic polyurethane elastomer by forming a polyurethane reactive mixture which is prepared by reacting 1,4-butanediol and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate** and then allowing the mixture to cure in a mold.

As mentioned above, Yokelson et al. disclose that the compatibility of their claimed diol (DIFOL), **in contrast** to a diol used in the comparative example (poly(oxytetramethylene) glycol (PTMO) 2000), when combined with 1,4-butandiol, produces a hazy mixture. See Yokelson et al., column 10, lines 36-44. Applicants therefore contend that Yokelson et al. teach away from the use of 1,4-butanediol as a chain extender.

Additionally, **before curing**, but after the mixture is poured into a mold, the reactive mixture disclosed in Example 2 of Yokelson et al. (which is based on an

isocyanate-terminated prepolymer) is subjected to **compression** at 20,000 psi for one hour. See Yokelson et al., column 13, lines 28 and column 14, line 67.

Considering the foregoing, Applicants respectfully request that the Patent Office enter allowance of Claims 12, 13 and 14.

Rejection of Claims 1-11 under 35 U.S.C. § 103(a) in view of Yokelson et al.:

The Patent Office believes that Yokelson et al. disclose the use of cycloaliphatic diisocyanates to produce polyurethanes. The Patent Office takes the position that one having ordinary skill in the art, seeking light stable polyurethanes, would have been motivated to utilize the cycloaliphatic diisocyanates of Yokelson et al. since it has long been established that polyurethanes derived from non-aromatic diisocyanates possess superior light stability properties as compared to polymers derived from aromatic isocyanates.

In order to support a rejection based on obviousness, the prior art must provide a motivation or reason for the worker in the art, without the benefit of the Applicants' specification, to make the necessary changes in the reference invention. See Ex parte Chicago Rawhide Manufacturing Co., 226 U.S.P.Q. 438 (PTO Bd. App. 1984). It is impermissible to use Applicants' claims as a frame and the cited references as a mosaic to piece together a facsimile of the claimed invention. See Uniroyal Inc. v. Rudkin-Wiley Corp., 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

Applicants contend that, after reading Yokelson et al., one skilled in this art would not have been motivated to prepare an elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is the reaction product of an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate.

Support for Applicants' position is found in Comparative Example 6 of the Application.

Comparative Example 6 of Applicants' claimed invention generally follows the teachings of Yokelson et al. for preparing an elastomer having improved mechanical properties by a prepolymer process, with one exception. Comparative Example 6 of Applicants' claimed invention uses an isocyanate terminated prepolymer comprising the reaction product of an HFPB and 4,4'-diphenylmethane diisocyanate ("MDI").

Yokelson et al. disclose a process for preparing an elastomer using an isocyanate terminated prepolymer comprising the reaction product of an HFPB and TDI. See Yokelson et al., column 13, line 18. The reaction product of the chain extender and the prepolymer of Comparative Example 6 yields a plaque which, after curing, is opaque, cheesy and brakes into pieces when flexed by hand.

Both TDI and MDI are aromatic diisocyanates. Aliphatic isocyanates are more expensive than aromatic diisocyanates. See Exhibit 1, Encyclopedia of Chemical Technology, Vol. 14, 4<sup>th</sup> Ed., page 930. Additionally, Yokelson et al. disclose that the isocyanates of their invention are isocyanates which **exhibit several or all of the following characteristics:** bulk; symmetry around the isocyanate functional groups; **rigidity; crystallinity; are aromatic** and highly pure. See Yokelson et al., column 5, lines 1-5. Aliphatic isocyanates are not aromatic. Additionally, one skilled in the art would recognize that **aliphatic isocyanates are less rigid than aromatic isocyanates.**

Giving the foregoing, and if two aromatic diisocyanates do not perform equally well, why would one skilled in the art be motivated to use a non-aromatic, non-crystalline, not highly rigid diisocyanate (i.e., a non-crystalline aliphatic or cycloaliphatic diisocyanate) in the Yokelson et al. prepolymer process? Applicants contend that one having ordinary skill in the art would have had no desire, and thus no motivation, to use a non-crystalline aliphatic or cycloaliphatic diisocyanate in the Yokelson et al. prepolymer process. Applicants therefore submit that Claims 1-11 are not obvious in view of Yokelson et al. Thus, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 1-11 under 35 U.S.C. § 103(a) and enter allowance of these Claims.

Rejection of Claims 1-11 under 35 U.S.C. § 102(e) in view of Taylor et al.:

The Patent Office rejected Claims 1-11 under 35 U.S.C. § 102(e) in view of Taylor et al. The Patent Office believes that Taylor et al. disclose the production of polyurethanes from aliphatic or cycloaliphatic diisocyanates, chain extenders and polyols.

In order for a reference to anticipate, the claimed invention **must be the same** as that of the reference. See Glaverbel Societe Anonyme v. Northlake

Marketing & Supply Inc., 45 F.3d 1550, 33 U.S.P.Q.2d 1496, 1498 (Fed. Cir. 1995).

Any degree of physical difference, however slight, invalidates a claim of anticipation. See Ultradent Products Inc. v. Life-Like Cosmetics Inc., 39 U.S.P.Q. 2d 1969, 1980 (Utah 1996). Applicants' claimed invention is not anticipated by Taylor et al. because Taylor et al. do not disclose a light stable hydrophobic polyurethane elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**.

Taylor et al. disclose a process for improving the mechanical properties of an elastomer obtained by not only curing but also by extruding a casting composition of an elastomer, the process comprising: a) providing an elastomer comprising the reaction product of a prepolymer and a diol chain extender, the prepolymer comprising the reaction product of a HFPB and an **aromatic diisocyanate**; b) chain extending the prepolymer with 1,4-butanediol to form a casting composition; c) improving the poor physical properties of the polyurethane obtained by reacting the chain extender with the isocyanate terminated prepolymer which comprises the reaction product of HFPB and an aromatic diisocyanate (such as MDI) by extruding the casting composition to form at least one strand of a polyurethane elastomer; d) pelletizing the at least one strand of polyurethane elastomer to form at least one pellet; and e) processing the at least one pellet to form a thermoplastic polyurethane material. See Taylor et al., column 4, lines 10-15 and 64- 65; Table 3.

It is Applicants' position that Taylor et al., by way of their Examples 1 and 2, disclose preparing an elastomer which is the reaction product of a chain extender and an isocyanate terminated prepolymer which is prepared by reacting HFPB with **MDI**. See Taylor et al., column 4, lines 10-66. Thus, Applicants contend that Taylor et al. do not provide any examples for preparing an elastomer having improved mechanical properties based on the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer comprising the reaction product of an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**.

While Applicants understand that the fact that a specification is devoid of a working example may not be of significance (See Ex parte Nardi and Simier, 229

U.S. P.Q. 79 B.P.A.I. 1986), Applicants also recognize the fact that, in order to have an enabling disclosure, the specification must contain a sufficiently explicit disclosure to enable one having ordinary skill in the relevant art to practice the claimed invention without the exercise of undue experimentation. See Ex parte Forman, 230 U.S.P.Q. 546 (B.P.A.I. 1986). Many factors are taken into account when determining what constitutes undue experimentation. See Tabuchi and Abe v. Nubel, Fitts and Lorenzo, 559 F.2d 1183, 194 U.S.P.Q. 521, 525 (C.C.P.A. 1977).

Aliphatic isocyanates are not aromatic. Considering the foregoing, Applicants respectfully contend Taylor et al. do not provide a disclosure which would have enabled one skilled in this art to prepare an elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**. Applicants therefore submit that Claims 1-11 are not anticipated by Taylor et al. Thus, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 1-11 under 35 U.S.C. § 102(b) in view of Taylor et al. and enter allowance of these Claims.

Additionally, Claims 1-11 are not obvious in view of Taylor et al. Applicants contend that, after reading Taylor et al., one skilled in this art would not have been motivated to prepare an elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is the reaction product of an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate.

Support for Applicants' position is found in Comparative Example 6 of the Application.

Comparative Example 6 of Applicants' claimed invention uses an isocyanate terminated prepolymer comprising the reaction product of HFPB and MDI. The reaction product of the chain extender and the prepolymer of Comparative Example 6 yields a plaque which, after curing, is opaque, cheesy and brakes into pieces when flexed by hand.

Both TDI and MDI are aromatic diisocyanates. Aliphatic isocyanates are more

expensive than aromatic diisocyanates. See Exhibit 1. Giving the foregoing, and if two aromatic diisocyanates do not perform equally well, why would one skilled in the art be motivated to use a non-aromatic, non-crystalline diisocyanate (i.e., a non-crystalline aliphatic or cycloaliphatic diisocyanate) in the Taylor et al. prepolymer process?

Applicants contend that one having ordinary skill in the art would have had no desire, and thus no motivation, to use a non-crystalline aliphatic or cycloaliphatic diisocyanate in the Taylor et al. prepolymer process. Applicants therefore submit that Claims 1-11 are not obvious in view of Taylor et al.

Additionally, new Claims 12, 13 and 14 are patentable over Taylor et al.

Claim 12 is directed to a light stable hydrophobic polyurethane elastomer which is composed of the reaction product of 1,4-butanediol and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate**. As mentioned above, the prepolymer process of Taylor et al. uses an **aromatic diisocyanate**.

New Claim 13 is directed to a process for preparing a light stable hydrophobic polyurethane elastomer by forming a polyurethane reactive mixture which is prepared by reacting a symmetric diol chain extender and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a **non-crystalline aliphatic or cycloaliphatic diisocyanate** and then allowing the mixture to cure in a mold. Unlike Taylor et al., Applicants do not extrude their reactive mixture.

New Claim 14 is directed to a process for preparing a light stable hydrophobic polyurethane elastomer by forming a polyurethane reactive mixture which is prepared by reacting 1,4-butanediol and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate and then allowing the mixture to cure in a mold. Again, unlike Taylor et al., Applicants do not extrude their reactive mixture.

Considering the foregoing, Applicants respectfully request that the Patent Office enter allowance of Claims 12, 13 and 14.

Rejection of Claims 1-8 and 10-11 under 35 U.S.C. § 102(e) in view of Haider et al:

The Patent Office rejected Claims 1-8 and 10-11 under 35 U.S.C. § 102(e) in view of Haider et al. The Patent Office believes that Haider et al. disclose the production of polyurethanes from aliphatic or cycloaliphatic diisocyanates, chain extenders and polyols.

The claimed invention must be the same as that described in the reference in order for the reference to anticipate. See Glaverbel Societe Anonyme v. Northlake Marketing & Supply Inc., 33 U.S.P.Q.2d 1496, 1498 (Fed. Cir. 1995).

Haider et al. disclose an elastomer based on a chain extender reacted with an isocyanate terminated prepolymer comprising the reaction product of an HFPB and from 10 to 70 percent by weight of an isocyanate. The chain extender of Haider et al., however, is an asymmetric diol chain extender having a molecular weight ranging from 75 to 200. See column 2, line 41.

Haider et al. requires the use of an asymmetric diol chain extender such as 2,2,4-trimethylpentane-1,3-diol (TMPD) to produce a useable elastomer. As shown by Comparative Examples 4 and 9 in Haider et al., the use of a diol chain extender with a plane of symmetry (such as 1,4-butanediol) yields an undesirable and/or unusable elastomer.

Applicants' claimed invention, on the other hand, is directed to an elastomer which is composed of the reaction product of a symmetric diol chain extender and an isocyanate terminated prepolymer which is the reaction product of an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate. Given the foregoing, Applicants submit that Claims 1-8 and 10-11 are not anticipated by Haider et al. Thus, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 1-8 and 10- 11 under 35 U.S.C. § 102(b) and enter allowance of these Claims.

Additionally, new Claims 12, 13 and 14 are patentable over Haider et al.

Claim 12 is directed to a light stable hydrophobic polyurethane elastomer which is composed of the reaction product of **1,4-butanediol** and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate. As mentioned above, Haider et al. use

asymmetric chain extenders.

New Claim 13 is directed to a process for preparing a light stable hydrophobic polyurethane elastomer by forming a polyurethane reactive mixture which is prepared by reacting a **symmetric diol chain extender** and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate and then allowing the mixture to cure in a mold. As mentioned above, Haider et al. use asymmetric chain extenders.

New Claim 14 is directed to a process for preparing a light stable hydrophobic polyurethane elastomer by forming a polyurethane reactive mixture which is prepared by reacting **1,4-butanediol** and an isocyanate terminated prepolymer which is prepared by reacting an HFPB and a non-crystalline aliphatic or cycloaliphatic diisocyanate and then allowing the mixture to cure in a mold. Again, as mentioned above, Haider et al. use asymmetric chain extenders.

Considering the foregoing, Applicants respectfully submit that new Claims 12, 13 and 14 are patentable. Applicants therefore respectfully request that the Patent Office enter allowance of Claims 12, 13 and 14.

Rejection of Claims 1-2, 4-8 and 10-11 under 35 U.S.C. § 102(b) in view of Frisch et al.:

The Patent Office rejected Claims 1-2, 4-8 and 10-11 under 35 U.S.C. § 102(b) in view of Frisch et al. The Patent Office believes that Frisch et al. disclose a polyurethane elastomer derived from the reaction of a cycloaliphatic diisocyanate with a polybutadiene diol and a diol chain extender.

Free radical and anionic polymerizations were the two major routes employed for the synthesis of HFPB's. See Exhibit 2, Rubber Chem. Technol., *Hydroxyl-Terminated Polybutadiene Telechelic Polymer: Binder For Solid Rocket Propellants*, Vol. 68 (3), pages 480-506 (1995). Free radical polymerization was the most **commonly used method** to synthesize HFPB's. Regardless of whether one used free radical polymerization (See Exhibit 2, Figure 3, page 484) or anionic

polymerization (See Exhibit 2, Table V, page 487), a mixture of 1,4 and 1,2 microstructures resulted.

The commercially available materials described in Exhibit 2 were all prepared by one of these two routes. See Exhibit 2, Table II, page 482. In light of the fact that Frisch et al. do not give any structural information on the polybutadiene polyols disclosed, other than a molecular weight of 300-3000, the skilled artisan can reasonably assume that the polyols disclosed in Frisch et al. were one of the two types described above.

In contrast, the HFPB's of Applicants' claimed invention are not produced by either of the two conventional methods available at the time of Frisch et al. Instead, Applicants use a Ring Opening Metathesis Polymerization (ROMP) method as disclosed in United States Patent No. 5,342,909. This procedure results in HFPB's having a 1,4- microstructure. Additionally, the functionality of the HFPB's of Applicants' claimed invention are within the range of from 1.9 - 2.1, which is lower than the functionality which results from free radical polymerization (2.2- 2.6). See Exhibit 3.

Clearly, then, the HFPB's of Applicants' claimed invention are chemically distinct from the HFPB's produced by anionic or free radical methods used at the time of Frisch et al.

Considering the foregoing, Applicants submit that Claims 1-2, 4-8 and 10-11 are not anticipated by Frisch et al. Thus, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 1-2, 4-8 and 10-11 under 35 U.S.C. § 102(b) in view of Frisch et al.

Rejection of Claims 1-2, 4, 6 and 8-11 under 35 U.S.C. § 102(b) in view of Huang et al.:

The Patent Office rejected Claims 1-2, 4, 6 and 8-11 under 35 U.S.C. § 102(b) in view of Huang et al. The Patent Office believes that Huang et al. disclose a polyurethane elastomeric composition derived form the reaction of rMDI with a polybutadiene diol and 1,4-butanediol.

Huang et al. clearly state on page 1236 that they used **R-45M** as their HFPB. Exhibit 3 shows the mixture of 1,4 and 1,2-microstructure which results in pendant

vinyl groups which are absent in Applicants' HFPB's. Additionally, R-45M has a higher functionality (2.2 - 2.4) than that of Applicants' claimed HFPB's.

Clearly, then, the HFPB's of Applicants' claimed invention are chemically distinct from the HFPB's of Huang et al.

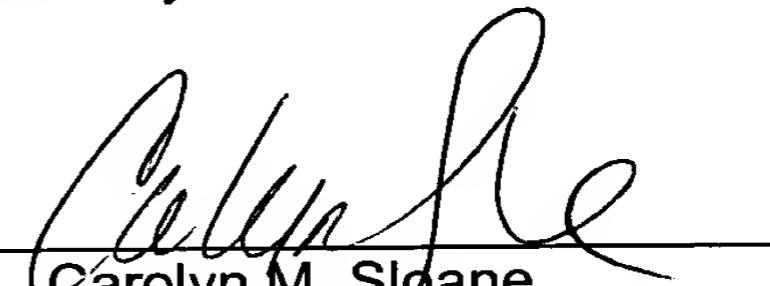
Considering the foregoing, Applicants submit that Claims 1-2, 4-8 and 10-11 are not anticipated by Huang et al. Thus, Applicants respectfully request that the Patent Office withdraw its rejection of Claims 1-2, 4-8 and 10-11 under 35 U.S.C. § 102(b) in view of Huang et al.

#### CONCLUSION

For the foregoing reasons, Applicants respectfully request: that the amendment to Claim 1 be entered; that new Claims 12, 13 and 14 be added to the Application; that the rejection of Claims 1-11 under 35 U.S.C. § 102(b) in view of Yokelson et al. be withdrawn; that the rejection of Claims 1-11 under 35 U.S.C. § 103(a) in view of Yokelson et al. be withdrawn; that the rejection of Claims 1-11 under 35 U.S.C. § 102(e) in view of Taylor et al. be withdrawn; that the rejection of Claims 1-8 and 10-11 under 35 U.S.C. § 102(e) in view of Haider et al. be withdrawn; that the rejection of Claims 1-2, 4-8 and 10-11 under 35 U.S.C. § 102(b) in view of Frisch et al. be withdrawn; that the rejection of Claims 1-2, 4, 6 and 8-11 under 35 U.S.C. § 102(b) in view of Huang et al. be withdrawn; and that pending Claims 1-14 be allowed to issue as a U.S. patent.

Respectfully submitted,

By



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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

### In the Claims:

Claim 1 has been amended as follows:

1. (Twice Amended, Marked-Up) A light stable hydrophobic polyurethane elastomer comprising the reaction product of:

- A) an isocyanate terminated prepolymer having an isocyanate content ranging from 4 to 12 wt. % NCO comprising the reaction product of:
  - i) an OH terminated homopolymer of butadiene having a molecular weight ranging from 1000 to 4000 and an OH functionality of from 1.9 to 2.1; and
  - ii) a[n] non-crystalline aliphatic or cycloaliphatic diisocyanate; and
- B) a symmetric diol chain extender having a molecular weight ranging from 62 to 400.

New Claims 12, 13 and 14 have been added to the Application as follows:

- 12. A light stable hydrophobic polyurethane elastomer comprising the reaction product of:
  - A) an isocyanate terminated prepolymer having an isocyanate content ranging from 4 to 12 wt. % NCO comprising the reaction product of:
    - i) an OH terminated homopolymer of butadiene having a molecular weight ranging from 1000 to 4000 and an OH functionality of from 1.9 to 2.1; and
    - ii) a non-crystalline aliphatic or cycloaliphatic diisocyanate; and
  - B) 1,4-butanediol.
- 13. A process for preparing a light stable hydrophobic polyurethane elastomer comprising:
  - A) forming a polyurethane reactive mixture by reacting:
    - i) an isocyanate terminated prepolymer having an isocyanate content ranging from 4 to 12 wt. % NCO comprising the reaction product of:
      - a) an OH terminated homopolymer of butadiene having a molecular weight ranging from 1000 to

4000 and an OH functionality of from 1.9 to 2.1;  
and

b) a non-crystalline aliphatic or cycloaliphatic diisocyanate;

with

ii) a symmetric diol chain extender having a molecular weight ranging from 62 to 400;

and

B) allowing the reactive mixture to cure in a mold.

14. A process for preparing a light stable hydrophobic polyurethane elastomer comprising:

A) forming a polyurethane reactive mixture by reacting:

i) an isocyanate terminated prepolymer having an isocyanate content ranging from 4 to 12 wt.% NCO comprising the reaction product of:

a) an OH terminated homopolymer of butadiene having a molecular weight ranging from 1000 to 4000 and an OH functionality of from 1.9 to 2.1;  
and

b) a non-crystalline aliphatic or cycloaliphatic diisocyanate;

with

ii) 1,4-butanediol;

and

B) allowing the reactive mixture to cure in a mold. --